A new compact, cost-efficient concept for underwater range-gated imaging: the UTOFIA project

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A new compact, cost-efficient concept for underwater range-gated imaging: the UTOFIA project

http://www.utofia.eu

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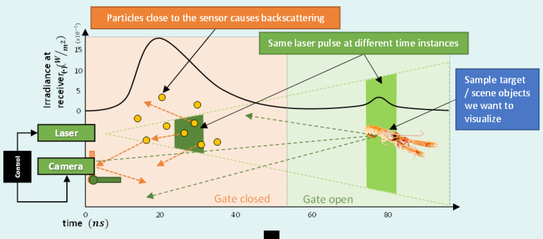
ICES CM 2015/C15

2014
The Concept

UTOFIA will develop a compact and cost-effective underwater imaging system for turbid environments. By using range-gated imaging, the system will extend the imaging range by factor 2 to 3 over conventional video systems. At the same time, the system will provide video-rate 3D information. This will fill the current gap between short-range, high-resolution conventional video and long-range low-resolution sonar systems.

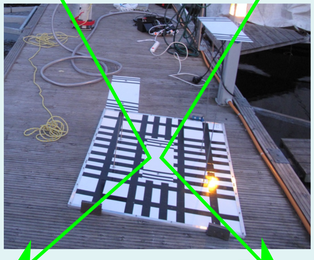


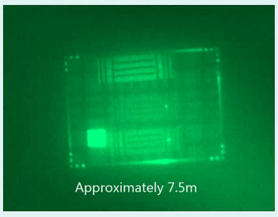
2015
Zero prototype
Results

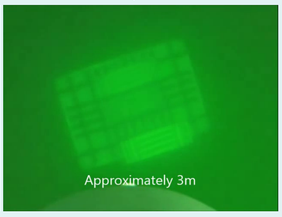
vs

The Aspirant
UTOFIA zero

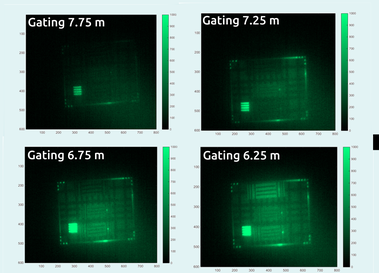
The low cost champion
GoPro 4







Back scatter reduction --> 2.5 x longer range



3D ABILITY --> the distances to and the size of an object is known.

End-user feedback

2017
Final testing

* Benthic habitat and population mapping:
  - compared with traditional sensors used for the assessment of Nephrops or sea urchin or to study seafloor habitats integrity

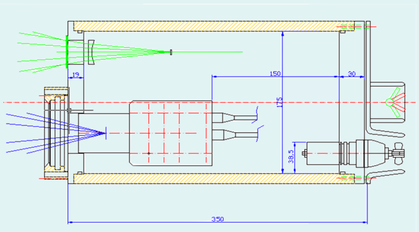
* Marine litter survey:
  - performance assessed compared to existing technologies in variable visibility conditions (Marseille harbour)

* Pelagic fish school size and species identification
  - explore the feasibility of 3D imaging for pre-screening fish schools for fisheries applications or for species and size identification in acoustic surveys (North Sea and Bay of Biscay)

2017
Final prototype
Target Specifications
To be defined but smaller and more close to final product

2016
Prototype one
Target Specifications

DESIGN PARAMETER	Description
Size	200 mm outer diameter and 350 mm long
Weight	11 kg maximum
Housingmaterial	Aluminum flanges in front and back connected with a POM tube
Cooling	Active cooling of back flange by a thruster motor with a propeller
Laser volume	4.1ltr (4,6ltr)
Volume beam optics	Ø50 x 120mm
Power	24 –30 V, 4A laser, 1A camera
Connector	13pin wet mateable hybrid GigE+powerin the back flange
Wiring	8pin Ethernet,2 pin 28Volt, 1pin ground/shield.2 pin RS485
Cable	hybrid GigE, powerand signal, length 80 m (TBD) 50 -100m
Camera	Form fit and function as for System 0. Two more outputs areavailablefor the odos camera.FRG camera will be mounted on a bracket compatible with the odoscamera.
Camera lens	Fixed focus camera lens f/# < 1 Remote operated focus for camera lens
Field of view	3,5 x 3 m at 5m distance
Field of illumination	Ø 2 –2,5m at 5 m distance. (depending on diffusor)
Laser	Pulse energy: 2mJat 1kHzEye safetyclassification: 3B



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